



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/689,237	10/20/2003	Kevin T. Slattery	38190/267685	3863

826 7590 01/12/2006

ALSTON & BIRD LLP
BANK OF AMERICA PLAZA
101 SOUTH TRYON STREET, SUITE 4000
CHARLOTTE, NC 28280-4000

EXAMINER

SAVAGE, JASON L

ART UNIT PAPER NUMBER

1775

DATE MAILED: 01/12/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/689,237	Applicant(s) SLATTERY, KEVIN T.	
	Examiner Jason L. Savage	Art Unit 1775	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 4 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) 1-15 and 33-35 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 16-27 and 29-32 is/are rejected.
- 7) ☒ Claim(s) 28 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>20031020</u> . | 6) <input type="checkbox"/> Other: ____. |

Election/Restrictions

Claims 1-15 and 33-35 have been withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected inventions, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 10-25-05. Applicant did not point any error in the restriction requirement, therefore the restriction is proper and FINAL.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 29-31 are rejected under 35 U.S.C. 102(e) as being anticipated by Tapphorn et al (US 6,915,964).

Tapphorn teaches a method of forming a preform by providing a base member substrate and spraying particles of structural material onto the base member to form the preform (col. 6, ln. 35-65).

Regarding claim 29, Tapphorn further teaches that the preform may be machined (col. 33, ln. 1-3). As such, the machined preform of Tapphorn would meet the claim limitations. Regarding the limitation that the method includes the step of determining

Art Unit: 1775

the desired dimensions of the structural member, such a determination step would have been inherent in the method of Tapphorn.

Regarding claim 30, Tapphorn teaches that after the preform is formed, it may be subjected to annealing, hot isostatic pressing and heat treating (col. 32, ln. 61-67 and col. 33, ln. 15-19).

Regarding claim 31, Tapphorn teaches the spraying stream of structural material is sufficiently low (col. 5, ln. 16-25).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 16-17, 19-21, 23-25 and 32 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Tapphorn et al (US 6,915,964).

Tapphorn teaches a method of forming a preform by providing a base member substrate and spraying particles of structural material onto the base member to form the preform, wherein the spraying process causes the particles and substrate to undergo plastic deformation which causes metallurgical bonding (col. 6, ln. 35-65).

Regarding the limitation in claim 16 that the method includes the step of determining the desired dimensions of the structural member, such a determination step would have been inherent in the method of Tapphorn. Regarding the limitation that the preform is plastically deformed to the dimensions of the structural member, the plastic deformation of the particles to bond the particles to the base member substrate to form the perform would meet the limitation of plastic deformation of the structural member. Furthermore, the thusly formed preform and structural member would meet the limitation of having the desired dimensions of the structural member since Tapphorn does not require any further processing of the preform.

In the alternative, Tapphorn teaches that after the preform is formed, it may be subjected to plastic deforming steps of annealing, hot isostatic pressing, (col. 32, ln. 61-67), heat treating (col. 33, ln. 15-19) and machining or polishing (col. 34, ln. 1-3). It would have been obvious to one of ordinary skill in the art at the time of the invention to have subjected the preform of Tapphorn to post formation plastic deformation steps such as those recited by Tapphorn in order to produce a structural member having the desired dimensions and properties for its intended use.

Regarding claim 17, Tapphorn teaches the preform may be subjected to annealing, hot isostatic pressing, and heat treating (col. 32, ln. 61-67 and col. 33, ln. 15-19).

Regarding claim 19, Tapphorn teaches the structural material may be titanium (col. 13, ln. 29-40).

Art Unit: 1775

Regarding claim 20, Tapphorn teaches the temperature of the spraying stream of structural material is sufficiently low (col. 5, ln. 16-25).

Regarding claim 21, although Tapphorn does not explicitly recite the base member is deformed, the plastic deformation of the particles during spraying would also result in plastic deformation of the base member. Furthermore, the post formation processes recited above could also involve deformation of the base member. Absent a teaching of the criticality or showing of unexpected results, the claimed step of deforming the base member would not provide a patentable distinction over the prior art.

Regarding claim 23, Tapphorn teaches multiple deformation steps which require heating of the preform.

Regarding claim 24, Tapphorn's teaching of isostatic pressing would meet the limitation of the preform being urged against a forming surface and thereby forging the preform.

Regarding claim 25, although Tapphorn does not explicitly recite the grain size is refined in the preform, it does teach that a heat treating step of the preform can form intermetallic-strengthening phases dispersed in the structural material (col. 33, ln. 15-18). It is the position of the Examiner that such a step would meet the limitation of refining the grain sizes of the preform. In the alternative, it would have been obvious to one of ordinary skill at the time of the invention to have subjected the preform of Tapphorn to a grain refining treatment since Tapphorn teaches that it is desirable to

Art Unit: 1775

tailor the specific material properties of the preform including the grain sizes (col. 10, ln. 1-3).

Claims 18, 26-27 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tapphorn et al (US 6,915,964) as applied to claims 16-21 and 23-25 above.

Tapphorn teaches what is set forth above however it is silent to some of the claim limitations.

Regarding claims 18 and 32, Tapphorn teaches that the structural material may be sprayed with a reactive gas such as hydrogen. While Tapphorn does not teach that the hydrogen is released after the spraying step, it does teach that the hydrogen is released from the structural material (col. 29, ln. 1-41). It would have been within the purview of one of ordinary skill in the art to have recognized that the hydrogen could be desirably removed from the structural material at any point in the preform forming method. Absent a teaching of the criticality of the hydrogen being released after spraying as opposed prior to deposition of the structural material, it would not provide a patentable distinction over the prior art. Regarding the limitation that the structural material is subjected to a sub-atmospheric pressure when releasing the hydrogen, it would have been obvious to one of ordinary skill in the art to have used some form of vacuum or sub-atmospheric pressure in order to sufficiently remove the hydrogen from the structural material and prevent further reaction between the two materials.

Regarding claim 26, Tapphorn is silent to subjecting the preform to a sub-atmospheric pressure and subsequently cold isostatically pressing to reduce the porosity of the preform. However, as was set forth with respect to claims 18 and 32 above, it would have been obvious to one of ordinary skill in the art to have used some form of vacuum or sub-atmospheric pressure in order to sufficiently remove the hydrogen from the structural material and prevent further reaction between the two materials. Furthermore, it would have been obvious to have subjected the preform to some form of sub-atmospheric pressure such as a vacuum after the structural material was sprayed and prior to a consolidation step in order to minimize any oxidation of the structural material while the preform is still being processed.

Regarding the limitation that the preform is cold isostatically pressed to reduce the porosity, while Tapphorn is silent to the step of cold isostatical pressing, it does teach that the material properties such as porosity can be tailored (col. 10, ln. 1-3). Tapphorn further teaches that the preform may be hot isostatically pressed (col. 32, ln. 61-67). Absent a teaching of the criticality or showing of unexpected results from the preform being cold isostatically pressed as opposed to hot isostatically pressed, it would not provide a patentable distinction over the prior art. It would have been within the purview of one of ordinary skill in the art to recognize that any known method of reducing the porosity in the preform could be employed with a reasonable expectation of success.

Regarding claim 27, Tapphorn teaches that a porous preform may be sealed in a membrane (col. 13, ln 29-40). Absent a teaching of the criticality of the claimed step of

Art Unit: 1775

sealing the preform prior to the pressing step, it would not provide a patentable distinction over the prior art since Tapphorn teaches sealing the preform as well as pressing the preform.

Claims 16, 22, 24-25 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ruckert et al. (GB 2 297 053).

Ruckert teaches a method of forming a preform by providing a spraying structural material to form a structural member having a desired dimensional shape of a knob (p. 7, first full paragraph).

Regarding claims 16 and 29, Ruckert further teaches that the thus formed preform is subjected to a plastically deforming step such as extrusion and further subjected to machining (p. 8, second and third paragraphs). Although Ruckert is silent to the claim limitations that a base member is provided on which the structural material is sprayed, it would have been obvious to one of ordinary skill in the art at the time of the invention to have used a base member to provide a surface onto which the sprayed material could be formed into the knob. Regarding the limitation that the method includes the step of determining the desired dimensions of the structural member, such a determination step would have been inherent in the method of Ruckert.

Regarding claim 22, although Ruckert is silent to providing a mold and removing the structural material from the mold, since Ruckert teaches that the structural material is intended to be made as an individual part (p. 6, first paragraph), it would have been within the purview of one of ordinary skill in the art to recognize that any method of

Art Unit: 1775

forming the individual knob Ruckert, including the claimed method, could be employed with a reasonable expectation of success. Absent a teaching of the criticality of the claimed method of forming the structural material on a base mold member and then separating it from the base mold member, it would not provide a patentable distinction over the prior art.

Regarding claim 24, the step of extruding the structural member would meet the limitation of urging the preform against a forming surface.

Regarding claim 25, Ruckert teaches that the preform is quickly cooled which results in grain size refinement (p. 7, first paragraph).

Claims 16, 20, 22, 29 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kinane et al (US 6,257,309).

Kinane teaches a method of forming a preform by providing a patterned base member substrate, preheating the base member and spraying particles of structural material onto the base member to form the preform (col. 1, ln. 45-61). Kinane further teaches that the thusly formed preform is easily machinable (col. 2, ln. 18-22).

Regarding claim 16, although Kinane does not explicitly recite the preform is plastically deformed, the teaching that the preform is machinable is taken as a teaching that the preform is intended to be plastically deformed by machining. It would have been obvious to one of ordinary skill in the art at the time of the invention to have plastically deformed the preform of Kinane by machining since the preform is taught as being suitable for such a use. Regarding the limitation that the method includes the

Art Unit: 1775

step of determining the desired dimensions of the structural member, such a determination step would have been inherent in the method of Kinane.

Regarding claim 20, Kinane teaches that the spraying process should preferably employ cold spraying guns (col. 3, ln. 47-55).

Regarding claim 22, Kinane teaches that the preform is typically separated from the base member substrate (col. 1, ln. 12-22).

Regarding claim 29, although Kinane does not explicitly recite the preform is subjected to machining, it teaches that the preform is easily machinable (col. 2, ln. 18-22). It would have been obvious to one of ordinary skill in the art at the time of the invention to have machined the preform of Kinane since the preform is taught as being suitable for such a use.

Regarding claim 31, Kinane teaches that the spraying process should preferably employ cold spraying guns (col. 3, ln. 47-55).

Prior Art Made of Record but not Relied Upon

The following is a list of prior art made of record but not relied upon in the rejections above:

McHugh et al. (US 5,718,863) teaches a method of forming a preform by cold spraying structural material onto a base member having desired dimensions forming a pattern for manufacturing dies, molds and related tooling (col. 1, ln. 18-22). McHugh further teaches that the gas used during spraying may be a gas which reacts with the

Art Unit: 1775

structural material to improve the material properties of the sprayed material including refinement of the grains (col. 4, ln. 29-40).

Shaikh et al. (US 6,602,545) teaches a method of forming a preform by spraying structural material onto a base member having desired dimensions forming a soft metal tooling (col. 1, ln. 57-67). Shaikh further teaches that structural material deposited by this method undergoes plastic deformation and consolidation which provides the preform with various desirable effects (col. 2, ln. 43-58). Shaikh also teaches that the base member also undergoes plastic deformation (col. 4, ln. 35-43). Shaikh further teaches that one main benefit of cold spraying is that oxygen-sensitive materials can be sprayed without significant oxidation and have much less porosity than conventional spraying methods (col. 4, ln. 61-65).

Hu et al. (US 6,905,728) teaches a method of repairing a structural member by cold spraying structural material onto a base member to restore the original desired dimensions of the member (col. 2, ln. 6-20). Hu further teaches that the structural member may be subjected to a variety of post-spray processing steps such as consolidation steps and structural material microstructure refinement (col. 2, ln. 32-40). Hu also teaches that the processing steps may include subjecting the structural member to sub-atmospheric pressure such as vacuum sintering, hot isostatic pressing and heat treatment (col. 2, ln. 45-51).

Allowable Subject Matter

Art Unit: 1775

Claim 28 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The prior art of Tapphorn teaches providing hydrogen gas during the formation of the preform and subjecting the preform to a variety of processes. However, it does not teach or suggest providing the hydrogen gas after the structural material has been deposited by spraying, subsequently subjecting the preform to sub-atmospheric pressure and cold isostatically pressing and finally heating the preform in a sub-atmospheric pressure to release the hydrogen from the preform.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason L. Savage whose telephone number is 571-272-1542. The examiner can normally be reached on M-F 6:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah Jones can be reached on 571-272-1535. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1775

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jason Savage

1-6-06


DEBORAH JONES
SUPERVISORY PATENT EXAMINER